

REMARKS

Applicant has reviewed the Office Action mailed on May 23, 2003, as well as the art cited. Claims 1-16 and 18-22 are pending in this application.

Information Disclosure Statement

Applicant respectfully requests that a copy of the 1449 form, listing all references that were submitted with the Information Disclosure Statement filed on March 19, 1999, marked as being considered and initialed by the Examiner, be returned with the next official communication.

Rejections Under 35 U.S.C. § 103

Claims 1 and 2 were rejected under 35 USC § 103(a) as being unpatentable over Bernstein et al. (U.S. Patent No. 5,729,370) (referred to here as "Bernstein") in view of Krajewski (U.S. Patent No. 4,402,076) (referred to here as "Krajewski").

Claim 1 is directed to a hybrid fiber/coax network. The network includes a head end, at least one optical distribution node coupled to the head end over at least one fiber optic link, and a plurality of coaxial cable links coupled to each of the at least one optical distribution node. A transmitter, disposed at the optical distribution node, that is responsive to signals from the plurality of coaxial cable links, converts analog signals to baseband digital signals and transmits the baseband digital signals to the head end over the at least one optical link. A receiver is disposed at the head end. The receiver is responsive to the baseband digital signals from the transmitter and converts the digital signals to analog signals for the head end.

The cited references, either along or in combination, fail to teach or suggest a transmitter, disposed at the optical distribution node, that is responsive to signals from the plurality of coaxial cable links, converts analog signals to baseband digital signals as recited in claim 1 of the present application.

The Office Action, in paragraph 8, took the position that Bernstein discloses a transmitter, disposed at the optical distribution node, that is responsive to signals from the plurality of coaxial cable links, that converts analog signals to digital signals and that transmits

the digital signals to the head end over the at least one optical link. The Office Action cited the items referenced in Bernstein with numerals 203 and 204 and the text at column 6, lines 7-11 and column 6, lines 25-30, where according to the Office Action it is explicitly disclosed that a DLC, supporting copper cable, converts analog signals to serial digital signals for transport over the optical link and that the DLC is switched with equipment that supports coax to offer greater bandwidth. The Office Action took the position that since the coax cable continues to carry the same analog signals (telephone) that the copper wire version of the Bernstein system carried in addition to higher bandwidth signals, it would have been obvious to one of ordinary skill in the art to continue the data format conversion from analog signals in the cable to serial digital in the fiber at the optical distribution node.

Applicant respectfully traverses the assertion it would have been obvious to one of ordinary skill in the art to continue the data format conversion from analog signals in the cable to serial digital in the fiber at the optical distribution node.

When the copper wires are replaced with coaxial cable in the Bernstein system, the DLC equipment is *removed* from the system and *replaced* with broadband access (BA) equipment 203, 204. *See* Bernstein, Abstract. The Office Action, in responding to related argument made in Applicant's previous response, apparently agrees that the DLC equipment is replaced (see Office Action, paragraph 1). In other words, Bernstein explicitly teaches that the DLC equipment is not suitable for use with the coaxial cable version of the Bernstein system.

Moreover, the Office Action contains no citation to any language in Bernstein that explicitly states that the broadband access (BA) equipment 203, 204 "converts analog signals to baseband digital signal" as recited in claim 1 of the present application. There is no such language in Bernstein. Bernstein is completely silent as to the BA equipment 203, 204 performing any such conversion of analog signals to baseband digital signals.

In connection with this point, the Office Action reasons that Bernstein explicitly discloses a DLC that converts analog signals to serial digital signals for transport over an optical link and that the DLC is replaced with equipment that supports coaxial cable in order to offer greater bandwidth. The Office Action further reasons that the coaxial cable version of Bernstein continues to support the same narrowband signals as did the copper wire/DLC version of the Bernstein system, in addition to supporting broadband services such as television. Thus, the

Office Action concludes that it is obvious that the conversion of analog signals to serial digital signals for transport over the optical link that occurs in the copper wire/DLC version of the Bernstein system would also take place in the coaxial cable version/BA version of the Bernstein system since the coaxial cable/BA version still carries the same narrowband signals as the copper-wire/DLC version in addition to other broadband signals.

However, simply because the BA equipment 203, 204 continues to handle narrowband signals (in addition to broadband signals) does not mean one of ordinary skill in the art would conclude that the broadband access equipment 203, 204 would necessarily handle the narrowband signals *in the same way* as the DLC. It is respectfully submitted that one of ordinary skill in the art, when encountering a teaching that a DLC is not suitable for handling *both narrowband signals and broadband signals* and is otherwise silent as to the issue with respect to the replacement BA equipment, would not find it obvious to use the techniques used in the DLC in BA equipment that is supposed to handle *both narrowband and broadband signals*.

In addition, the cited references, either along or in combination, fail to teach or suggest a transmitter, disposed at the optical distribution node, that is responsive to signals from the plurality of coaxial cable links, converts analog signals to *baseband* digital signals and transmits the *baseband* digital signals to the head end over the at least one optical link.

The Office Action concedes that "Bernstein possibly does not disclose that the digital signals are baseband digital signals." The Office Action asserts "However, the use of baseband signals is well-known in the art with one well-known benefit being that the transmission of baseband signals does not require the use of extra equipment to modulate and demodulate the signal, as is evidenced by Krajewski (col. 1, lines 15-25), thus reducing costs." The Office Action concludes that "It would have been obvious to one of ordinary skill in the art to transmit the digital signals as baseband signals in order to avoid the extra costs incurred by using equipment to modulate and demodulate the signal with respect to frequency."

It is respectfully submitted that Krajewski does not support the proposition set forth in the Office Action. The following portion of Krajewski is cited in the Office Action:

Some existing two-wire frequency division multiplex systems comprise two terminal stations A and B, connected by a two wire line, which operate on the same frequency channels (baseband) but each of the stations contains additional

frequency conversion equipment connected to either the transmit or the receive line terminals. Thus, station A may have its transmission converted to a different frequency band (sub-group) to be sent over the line and converted back to the original baseband for reception by station B. The process may be reversed by reconnecting the converter sections at both the terminal stations. A common sub-group carrier is used for both conversions.

Krajewski, column 1, lines 15-25.

The Office Action contains no explanation as to why one of ordinary skill in the art would consider a "two wire frequency division multiplex system" relevant to the optical link of Bernstein. Furthermore, it is respectfully submitted that Krajewski does not teach avoiding "the extra costs incurred by using equipment to modulate and demodulate the signal with respect to frequency." The Krajewski system includes "four identical channel modems" (modems being MOdoulator/DEModulatorS). *See* Krajewski, column 3, line 21. Indeed, Krajewski characterizes its claimed invention as including "means to modulate" and "means to demodulate" with respect to frequency. *See* Krajewski, claims 3 and 5. Therefore, it is respectfully submitted that one of ordinary skill in the art would not be motivated to make the proposed modification set forth in the Office Action.

Accordingly, Applicants respectfully request that this rejection be withdrawn.

Claim 2 depends from claim 1 and, for at least the reasons set forth above with respect to claim 1, Applicant respectfully requests that the rejection of this claim be withdrawn.

Claim 3 was rejected under 35 USC § 103(a) as being unpatentable over Bernstein et al. (U.S. Patent No. 5,729,370) in view of Krajewski (U.S. Patent No. 4,402,076) as applied to claim 1 above, and further in view of Radice (U.S. Patent No. 5,138,440). Applicant respectfully traverses this rejection.

Claim 3 depends from claim 1 and, for at least the reasons set forth above with respect to claim 1, Applicant respectfully requests that the rejection of this claim be withdrawn.

Claim 4 was rejected under 35 USC § 103(a) as being unpatentable over Bernstein et al. (U.S. Patent No. 5,729,370) in view of Krajewski (U.S. Patent No. 4,402,076) as applied to claim 1 above, and further in view of Radice (U.S. Patent No. 5,138,440). Applicant respectfully traverses this rejection.

Claim 4 depends from claim 1 and, for at least the reasons set forth above with respect to claim 1, Applicant respectfully requests that the rejection of this claim be withdrawn.

Claim 5 was rejected under 35 USC § 103(a) as being unpatentable over Bernstein et al. (U.S. Patent No. 5,729,370) in view of Krajewski (U.S. Patent No. 4,402,076) as applied to claim 1 above, and further in view of Sayeed et al. (U.S. Patent No. 5,828,677) and Radice (U.S. Patent No. 5,138,440). Applicant respectfully traverses this rejection.

Claim 5 depends from claim 1 and, for at least the reasons set forth above with respect to claim 1, Applicant respectfully requests that the rejection of this claim be withdrawn.

Claim 6 was rejected under 35 USC § 103(a) as being unpatentable over Bernstein et al. (U.S. Patent No. 5,729,370) in view of Krajewski (U.S. Patent No. 4,402,076) as applied to claim 1 above, and further in view of Johnson et al. (U.S. Patent No. 3,995,144) and Petroff (U.S. Patent No. 5,198,989). Applicant respectfully traverses this rejection.

Claim 6 depends from claim 1 and, for at least the reasons set forth above with respect to claim 1, Applicant respectfully requests that the rejection of this claim be withdrawn.

Claims 7, 9, and 10 were rejected under 35 USC § 103(a) as being unpatentable over Bernstein et al. (U.S. Patent No. 5,729,370) in view of Krajewski (U.S. Patent No. 4,402,076) in further view of Bodeep et al. (U.S. Patent No. 5,864,672) in further view of Chambers et al. (U.S. Patent No. 5,867,485) in further view of Radice (U.S. Patent No. 5,138,440). Applicant respectfully traverses this rejection.

Claim 7 is directed to a transmitter for an optical distribution node. The transmitter includes at least one bandpass filter that is operable to select a portion of the frequency spectrum that is associated with return paths signals for a hybrid fiber/coax network. The transmitter also includes at least one analog to digital converter, responsive to the at least one bandpass filter, that creates baseband digital data from the return path signals. The transmitter further includes at least one multiplexer, responsive to the at least one analog to digital converter, that creates a serial data stream from the baseband digital data from the at least one analog to digital converter and an optical transmitter, responsive to the at least one multiplexer, that is operable to transmit the serial data to a head end as a digital baseband signal.

For at least the reasons set forth above with respect to claim 1 of the present application, the cited references, either along or in combination, fail to teach or suggest a transmitter that

includes at least one analog to digital converter, responsive to the at least one bandpass filter, that creates baseband digital data from the return path signals.

Accordingly, Applicants respectfully request that this rejection of claim 7 be withdrawn.

Claims 9 and 10 depend from claim 7 and, for at least the reasons set forth above with respect to claim 7, Applicant respectfully requests that the rejection of these claims be withdrawn.

Claim 8 was rejected under 35 USC § 103(a) as being unpatentable over Bernstein et al. (U.S. Patent No. 5,729,370) in view of Krajewski (U.S. Patent No. 4,402,076) in further view of Bodeep et al. (U.S. Patent No. 5,864,672) in further view of Chambers et al. (U.S. Patent No. 5,867,485) in further view of Radice (U.S. Patent No. 5,138,440) as applied to claim 7 above, and further in view of Smith, III (U.S. Patent No. 4,112,488).

Claim 8 depends from claim 7 and, for at least the reasons set forth above with respect to claim 7, Applicant respectfully requests that the rejection of this claim be withdrawn.

Claim 11 was rejected under 35 USC § 103(a) as being unpatentable over Bernstein et al. (U.S. Patent No. 5,729,370) in view of Krajewski (U.S. Patent No. 4,402,076) in further view of Bodeep et al. (U.S. Patent No. 5,864,672) in further view of Chambers et al. (U.S. Patent No. 5,867,485) in further view of Radice (U.S. Patent No. 5,138,440) as applied to claim 7 above, and further in view of Ferris (U.S. Patent No. 3,931,473).

Claim 11 depends from claim 7 and, for at least the reasons set forth above with respect to claim 7, Applicant respectfully requests that the rejection of this claim be withdrawn.

Claim 12 was rejected under 35 USC § 103(a) as being unpatentable over Bernstein et al. (U.S. Patent No. 5,729,370) in view of Krajewski (U.S. Patent No. 4,402,076) in further view of Bodeep et al. (U.S. Patent No. 5,864,672) in further view of Chambers et al. (U.S. Patent No. 5,867,485) in further view of Radice (U.S. Patent No. 5,138,440) as applied to claim 7 above, and further in view of Sayeed et al. (U.S. Patent No. 5,828,677).

Claim 12 depends from claim 7 and, for at least the reasons set forth above with respect to claim 7, Applicant respectfully requests that the rejection of this claim be withdrawn.

Claims 13-16 were rejected under 35 USC § 103(a) as being unpatentable over Bernstein et al. (U.S. Patent No. 5,729,370) in view of Krajewski (U.S. Patent No. 4,402,076) in further view of Bodeep et al. (U.S. Patent No. 5,631,757).

Claim 13 is directed to a method for processing data in a return path of a hybrid fiber/coax network. The method includes receiving analog, upstream data at an optical distribution node from at least one coaxial cable link and generating baseband digital data from the analog, upstream data. The method also includes creating a serial data stream including the digital data and driving a digital laser to transmit the digital data in a baseband digital format to a head end of a network.

For at least the reasons set forth above with respect to claim 1 of the present application, the cited references, either along or in combination, fail to teach or suggest receiving analog, upstream data at an optical distribution node from at least one coaxial cable link and generating baseband digital data from the analog, upstream data as recited in claim 13 of the present application.

Accordingly, Applicants respectfully request that this rejection of claim 13 be withdrawn.

Claims 14-16 depend from claim 13 and, for at least the reasons set forth above with respect to claim 13, Applicant respectfully requests that the rejection of these claims be withdrawn.

Claims 18 and 20 were rejected under 35 USC § 103(a) as being unpatentable over Bernstein et al. (U.S. Patent No. 5,729,370) in view of Krajewski (U.S. Patent No. 4,402,076) in further view of Radice (U.S. Patent No. 5,138,440) in further view of Tsutsui (U.S. Patent No. 5,680,130).

Claim 18 is directed to a receiver for a digital data return path of a head end in a hybrid fiber/coax network. The receiver includes an optical receiver that is operable to receive a serial, digital baseband signal from an optical link. The receiver also includes at least one demultiplexer, responsive to the optical receiver, that demultiplexes the digital baseband signal. The receiver further includes at least one digital to analog converter, responsive to the at least one demultiplexer, that creates analog signals for the head end and at least one filter that is

operable to compensate for quantization effects in the frequency spectrum that is associated with return path signals for a hybrid fiber/coax network.

For at least the reasons set forth above with respect to claim 1 of the present application, the cited references, either along or in combination, fail to teach or suggest an optical receiver that is operable to receive a serial, digital baseband signal from an optical link and at least one digital to analog converter, responsive to the at least one demultiplexer, that creates analog signals for the head end as recited in claim 18 of the present application.

Accordingly, Applicants respectfully request that this rejection of claim 18 be withdrawn.

Claim 20 depends from claim 18 and, for at least the reasons set forth above with respect to claim 18, Applicant respectfully requests that the rejection of this claim be withdrawn.

Claim 19 was rejected under 35 USC § 103(a) as being unpatentable over Bernstein et al. (U.S. Patent No. 5,729,370) in view of Krajewski (U.S. Patent No. 4,402,076) in further view of Radice (U.S. Patent No. 5,138,440) in further view of Tsutsui (U.S. Patent No. 5,680,130) as applied to claim 18 above, and further in view of Hoffart (U.S. Patent No. 5,341,216).

Claim 19 depends from claim 18 and, for at least the reasons set forth above with respect to claim 18, Applicant respectfully requests that the rejection of this claim be withdrawn.

Claim 21 was rejected under 35 USC § 103(a) as being unpatentable over Bernstein et al. (U.S. Patent No. 5,729,370) in view of Krajewski (U.S. Patent No. 4,402,076) in further view of Radice (U.S. Patent No. 5,138,440) in further view of Tsutsui (U.S. Patent No. 5,680,130) as applied to claim 18 above, and further in view of Ferris (U.S. Patent 3,931,473) and Brouard et al. (U.S. Patent No. 4,244,046).

Claim 21 depends from claim 18 and, for at least the reasons set forth above with respect to claim 18, Applicant respectfully requests that the rejection of this claim be withdrawn.

Claim 22 was rejected under 35 USC § 103(a) as being unpatentable over Bernstein et al. (U.S. Patent No. 5,729,370) in view of Krajewski (U.S. Patent No. 4,402,076) in further view of Radice (U.S. Patent No. 5,138,440) in further view of Tsutsui (U.S. Patent No. 5,680,130) as applied to claim 18 above, and further in view of Sayeed et al. (U.S. Patent No. 5,828,677).

Claim 22 depends from claim 18 and, for at least the reasons set forth above with respect to claim 18, Applicant respectfully requests that the rejection of this claim be withdrawn.

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Title: DIGITAL RETURN PATH FOR HYBRID/FIBER COAX NETWORK

CONCLUSION

Applicant respectfully submits that claims 1-16 and 18-22 are in condition for allowance and notification to that effect is earnestly requested. If necessary, please charge any additional fees or credit overpayments to Deposit Account No. 502432.

If the Examiner has any questions or concerns regarding this application, please contact the undersigned at (612) 332-4720.

Respectfully submitted,

Date:

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